

**MULTI-BAND HORN ANTENNA USING  
FREQUENCY SELECTIVE SURFACES****ABSTRACT OF THE INVENTION**

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A waveguide (100) including at least one outer surface (105, 110, 115, 120) defining a waveguide cavity (140) and at least one inner surface (130, 135) positioned within the waveguide cavity (140). The inner surface (130, 135) includes a frequency selective surface (FSS) having a plurality of FSS elements (145) coupled to at least one  
10 substrate. The substrate defines a first propagation medium such that an RF signal having a first wavelength in the first propagation medium can pass through the FSS (130, 135). The FSS (130, 135) is coupled to a second propagation medium such that in the second propagation medium the RF signal has a second wavelength which is at least twice as long as a physical distance between centers of adjacent FSS elements  
15 (145). The second wavelength can be different than the first wavelength.